

Cutting-Edge Science with Primitive Equipment

Richard J. Borg

I went to work at the University of California Radiation Laboratory in October of 1952. Like most of my fellow employees, I was recruited while having just graduated from UC Berkeley.

Apart from Edward Teller and a few consultants from the UC Berkeley faculty, virtually all employees were less than 35 years old, and perhaps most were still in their twenties.

Most of us lived in Berkeley and commuted to Livermore at all hours of the day and night along the two-lane country roads that existed at that time. The Lab supplied the cars in which we car pooled, and we took turns chauffeuring. These cars were coal-black Pontiac sedans—a more ominous-looking vehicle is hard to imagine—and I frequently thought that their looks were appropriate to our mission. There were virtually no houses or apartments for sale or rent in the little town of Livermore. Besides, most employees were recent graduates without the means for down payments for houses.

The major task of the Radiochemistry Group was to separate various isotopes gathered from the explosion debris from devices exploded at the Nevada Test Site. These solid and gaseous samples were collected and brought back to Livermore for analysis. Sometimes, the samples arrived very early in the morning; many times we chemists would sleep on our office desks, tables, and floors the previous night awaiting their arrival. We separated the various elements in Navy barracks where high weeds climbed up the outside walls. What passed for chemical hoods were light boxes on casters, and most of our reagents were neatly stacked on an old-fashioned spindly card table. For a while,

needed glassware and other laboratory supplies were found in a truck parked outside the barracks, and the chemists used the truck as they would a conventional storeroom.

Visits to the Nevada Test Site were not only a pleasant diversion, but frequently exciting. On one visit, I had to accompany radioactive debris in a B-24 bomber back to the Alameda Naval Air Station. I had been commanded not to tell anyone where we came from. We had no sooner landed than the pilot was asked by a naval petty officer, clipboard in hand, for our place of departure. The pilot pointed to me—I was hiding in the back and vainly trying to spot my pickup car—leaving it to me to answer the officer's question. Thankfully, the big black Pontiac appeared. I hurriedly informed the petty officer I had to unload my cargo, and that I would talk to him as soon as we got our luggage in the car. I ran to the car with my cargo, quickly loaded it, and we immediately drove off—our secret still intact.



The first CDC 6600 computer arrived at the Lab in 1964.

No Batteries Needed

Liena Wasley

I started work at the Lab in 1956 as a hand computer. Hand computing was literally that—computing equations by hand. The physicist would separate an equation into several columns. He would explain what to do with each column (e.g., divide, subtract, or add). The final column was then plotted on graph paper with orange carbon so it could be reproduced and used as viewgraphs.

The Computation Department was very small in those days, but it steadily

grew. Dr. Sidney Fernbach was the head of the department. Those were the days of the big magnetic tapes, card readers, keypunch machines, and printouts. When the first CDC 6600 computer was installed, there were only four stations in the machine room. The different divisions had limited time to run their problems on a twice-a-day allocation for time. Sometimes, we would hang our own tapes to speed things up.

In 1956, Livermore had a population of about 6,000. I watched a lot of

growth, both with the town and the Laboratory. New and better ways to calculate equations arrived, and the Lab regularly increased its staff. Like almost everything else, changes arrived, and eventually I left Computation and went to the Environmental Sciences Division. I retired in 1995 after 39 years of service. I enjoyed working for the Laboratory, and those early days in Computation were some of the most memorable.

A very Modern Device

Charlie Blue

From a *Management Newsletter* article written by
Carol Gerich

Procurement Manager Charlie Blue got the job done—the Laboratory's first analog computer arrived via a hearse from Champaign, Illinois.

Herb York came into my shop one day, and said, "We can't be doing all these weapons calculations by hand in Berkeley." He said, "There's a very modern device out."
"What did you hear, Herb?" I asked.
"There's a guy, a physicist at the University of Illinois, who has invented a machine," he said.
"His name is Professor Nordsieck. Will you get that machine out here as quickly as you can? I need to do some calculations on it, and it'll do things in a very modern way—very far out."

I contacted Professor [Arnold] Nordsieck in the Physics Department of the University of Illinois. When I told him that we wanted his machine, he went into an absolute state of shock.

"Young man," he said, "do you realize that I have put 10 years of my life, day and night, into inventing and perfecting this analog computer? You're clear out in California?"

"Oh yes," I said, "we're right near the Bay Area. But it's no problem. We'll move it out."

"But, you can't do that," he protested. "What are you going to do with it?"

"Well, I really can't tell you over the phone what we're going to do with the thing," I replied, "but our people here are working on some very critical calculations that are important to the best interests of this country."

It took a lot of persuasion with this fellow. We even had other renowned scientists call the man and lean on him a bit. The professor didn't want to budge, but he finally agreed. I was going to fly it out here for safety reasons, but he didn't believe in airplanes.

"Those things are killers, they crash, and my machine isn't going to crash!"

"Look," he finally said, "I will agree to let the machine come out here to California for (I think) a six-month loan. But you have to have a highly trained technical person accompany the machine, and I will only agree if it is to come on the highway in a carefully controlled situation." He would not agree to any local transfer outfit from Champaign to bring it out here, so I didn't know what to do about it.

I called Ray Wood, who ran the University motor pool in Berkeley at that time. He said, "Well, I don't know whether I can make available a car for somebody to drive clear to Champaign and back. That's a very unusual request."



Charlie Blue.

In the meantime, we'd done measurements of the machine and weighed it. It turned out that with just an inch or so clearance, this machine would fit through the rear door of a Chevrolet meat wagon,* as we called it in those days. Then I asked, "Who's the technical person who wants to drive to Illinois and back?" Nobody.

Wood thought about it and came up with an idea. There was a secretary of the University at that time, Marjorie Woolman, who worked with Treasurer Robert Underhill. "Marjorie's brother just graduated from dental school," Wood told me. "He has taken the state boards, and he is available. Let me talk to him—Doctor Woolman—and see if he would be willing to take a vacation drive to the University of Illinois."

So I called back Professor Nordsieck, and I said, "I've got it all lined up. I've got a vehicle in mind, and there is a doctor who is going to drive."

"A doctor!" he said. "Technically knowledgeable?"

I said, "Very technically knowledgeable."

"Oh! So nice! Please send him out then."

I dispatched the good Doctor Woolman, with my compliments. About three days later, I received a phone call with the sorriest sounding voice you ever want to hear at the other end of the line. "Yes?" I said.

"This is Doctor Woolman."

I said, "You don't sound so good." He said, "Well, I'm not so good. A truck, a big highway truck, just knocked my car off the road with me in it. It broke the windows out of the van, and it is a mess."

Well, this Professor Nordsieck didn't take that too kindly. But we eventually got that thing in the truck and in due course delivered here to Livermore. This became the first Livermore computer, the Nordsieck Analog Computer.

*"Meat wagon" is a slang term for an ambulance or hearse.